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EXAMINER

ANDUJAR, LEONARDO

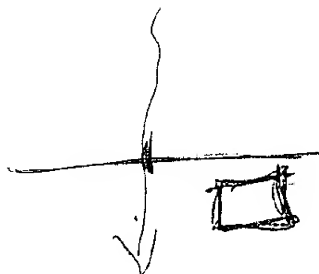
ART UNIT

PAPER NUMBER

2826

DATE MAILED: 08/28/2002

Please find below and/or attached an Office communication concerning this application or proceeding.



## Office Action Summary

Application No.

09/827,014

Applicant(s)

ADAE-AMOAKOH ET AL.

Examiner

Leonardo Andújar

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 28 June 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 10-19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 and 20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 April 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

**DETAILED ACTION*****Election/R strictions***

1. Applicant's election with traverse of Group I, claims 1-9 and 20 in Paper No. 4 is acknowledged. The traversal is on the ground(s) that the subject matter of claims 1-20 is sufficiently related that a thorough and complete search for the subject matter of the elected claims would necessarily encompass a thorough and complete search for the subject matter of the non-elected claims. This is not found persuasive because referring to the restriction requirement set forth in the Office Action paper no.3, it clearly shows that the alternative method proposed by the examiner would be distinct from the process claimed. Additionally, the search is not coextensive as evidenced by the different fields of search for the process and product as cited in the previous restriction requirement. Furthermore, Applicant has not provided a convincing argument that the materially different processes would not be suitable in producing the claimed device. Note that the unpatentability of the Group I invention would not necessarily imply unpatentability of the Group II invention. Thus the requirement is still deemed proper and is therefore made FINAL.

***Drawings***

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, "the selected area having approximately the shape of a circular disk approximately centered around the first contact are" and "the flat metal ring" must be shown or the feature(s) canceled from

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the claim(s). Also, "a semiconductor chip having a circuit", must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

3. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

***Specification***

4. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

***Claim Rejections - 35 USC § 112***

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claim 3 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is not clear to which element of the device the contact pad is parallel.

***Claim Rejections - 35 USC § 102***

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-3, 9 and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Lauffer et al. (US 5,665,650).

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9. Regarding claim 1, Lauffer (e.g. fig. 2) shows an electronic structure comprising:

- A substrate having a dielectric layer 14 between a first metal layer 22 and a second metal layer 22;
- A contact area located in the first metal layer (the region in contact with the layer 28);
- A selected area located on the second metal layer (the area around the through hole);
- A microvia cavity located within the selected area and extending through the second metal layer and the dielectric layer;
- And a mass of conductive material (28, 32 and 34) forming a layer upon the selected area of the second metal layer and being inside the microvia cavity and being in contact with the first contact area of the first metal layer.

10. The second metal layer is located above the first metal layer. Also, the selected area is disposed above the first contact area.

11. Regarding claim 2, Lauffer shows that the mass of conductive material conformally fills the microvia cavity.

12. Regarding claim 3 (as understood), Lauffer shows that the mass of conductive material has a planar surface forming a contact pad 34. The contact pad is located parallel to the first metal layer. Also, the contact pad is located opposite to the first contact area.

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13. Regarding claim 9, Lauffer discloses that the mass conductive material comprises a conductive paste 32 (col. 5/lis. 39-40)

14. Regarding claim 20, Lauffer (e.g. fig. 2) shows an assembly:

- A semiconductor chip 20 having a circuit;
- A substrate having a dielectric layer 14 between a first metal layer 22 and a second metal layer 22;
- A contact area located in the first metal layer (the region in contact with the layer 28);
- A selected area located on the second metal layer (the area around the through hole);
- A microvia cavity located within the selected area and extending through the second metal layer and the dielectric layer;
- And a mass of conductive material (28, 32 and 34) forming a layer upon the selected area of the second metal layer and being inside the microvia cavity and being in contact with the first contact area of the first metal layer.

15. The second metal layer is located above the first metal layer and the selected area is disposed above the first contact area. Also, the semiconductor chip is electrically connected to the mass of conductive material.

***Claim Rejections - 35 USC § 103***

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

17. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

18. Claims 4-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lauffer et al. (US 5,665,650).

19. Regarding claim 4, Lauffer discloses that the selected area is centered around the first contact area which correspond to an area defined by the via 18 (e.g. fig. 1c). Although it is well known in the art to make vias have a circular disk shape Lauffer does not disclose that the vias have a circular disk shape. However, Lauffer discloses that the shape of the circuit pattern (i.e. shape of the via hole 18) is a matter of design choice (col. 4/lls. 6-26). Therefore, this limitation or this shape difference between the claim invention and the prior art is considered to be an obvious design choice. Design choice limitations are not patentable unless unobvious or unexpected results are obtained from these changes. It appears that these changes produce no functional differences and therefore would have been obvious. Note *In re Leshin*, 125 USPQ 416.

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20. Regarding claims 5 and 6, Lauffer discloses that second metal layer within the selected area contains a flat metal layer having a perforation (via 18) that is approximately centered around the first contact area (e.g. fig. 1c). Although it is well known in the art that vias form a ring around its center Lauffer does not disclose that the perforation have a ring shape. However, Lauffer discloses that the shape of the circuit pattern (i.e. shape of the via hole 18) is a matter of design choice (col. 4/lis. 6-26). Therefore, this limitation or this shape difference between the claim invention and the prior art is considered to be an obvious design choice. Design choice limitations are not patentable unless unobvious or unexpected results are obtained from these changes. It appears that these changes produce no functional differences and therefore would have been obvious. Note *In re Leshin*, 125 USPQ 416.

21. Regarding claim 7, Lauffer discloses that second metal layer within the selected area contains a flat copper layer having a perforation (via 18) that is approximately centered around the microvia cavity (e.g. fig. 2). Although it is well known in the art that vias form a ring around its center Lauffer does not explicitly disclose that the via 18 forms a ring. However, Lauffer suggests that the shape of the circuit pattern (i.e. shape of the via hole 18) is a matter of design choice (col. 4/lis. 6-26). Therefore, this limitation or this shape difference between the claim invention and the prior art is considered to be an obvious design choice. Design choice limitations are not patentable unless unobvious or unexpected results are obtained from these changes. It appears that these changes produce no functional differences and therefore would have been obvious. Note *In re Leshin*, 125 USPQ 416.



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22. Regarding claim 8, Lauffer shows that the microvia cavity includes a via hole in the dielectric layer (e.g. fig. 2). With respect to the shape of the hole, i.e., truncated cone shape: This limitation, absent any criticality, is only considered to be an obvious modification of the shape of the via hole disclosed by Prior Art as the courts have held that a change in shape or configuration, without any criticality, is within the level of skill in the art as the particular shape claimed by applicant is nothing more than one of numerous shapes that a person having ordinary skill in the art will find obvious to provide using routine experimentation based on its suitability for the intended use of the invention. See *In re Dailey*, 149 USPQ 47 (CCPA 1976).

### ***Conclusion***

23. Papers related to this application may be submitted directly to Art Unit 2826 by facsimile transmission. Papers should be faxed to Art Unit 2826 via the Art Unit 2826 Fax Center located in Crystal Plaza 4, room 3C23. The faxing of such papers must conform to the notice published in the Official Gazette, 1096 OG 30 (15 November 1989). The Art Unit 2826 Fax Center number is **(703) 308-7722** or **-7724**. The Art Unit 2826 Fax Center is to be used only for papers related to Art Unit 2826 applications. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Leonardo Andújar** at **(703) 308-0080** and between the hours of 9:00 AM to 6:00 PM (Eastern Standard Time) Monday through Friday (with alternated Fridays off) or by e-mail via [Leonardo.Andujar@uspto.gov](mailto:Leonardo.Andujar@uspto.gov). If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn, can be reached on (703) 308-6601.

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24. Any inquiry of a general nature or relating to the status of this application should be directed to the **Group 2800 Receptionist** at **(703) 305-3900**.

25. The following list is the Examiner's field of search for the present Office Action:

Field of Search	Date
U.S. Class / Subclass (es): 257/691,778; 174/256, 266	08/02
Other Documentation:	
Electronic Database(s): East (USPAT, US PGPUB, JPO, EPO, Derwent, IBM TDB)	08/02

**Leonardo Andújar**

Patent Examiner Art Unit 2826

LA  
8/16/02

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FETSUM ABRAHAM  
PRIMARY EXAMINER